

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-41

**Name:** East 81 Lake                      **County:** Brookings  
**Legal Description:** T109N-R52W-Sec. 7, 18  
**Location from nearest town:** 4 miles south of Arlington, SD

**Dates of present survey:** August 18-20, 2008  
**Date last surveyed:** August 21-23, 2006

Primary Game and Forage Species	Secondary and Other Species
Yellow Perch	Northern Pike
Walleye	Black Bullhead
	White Bass
	White Sucker
	Yellow Bullhead

## PHYSICAL DATA

<b>Surface area:</b> 484 acres	<b>Watershed:</b> No data available
<b>Maximum depth:</b> Unknown	<b>Mean depth:</b> Unknown
<b>Volume:</b> Unknown	<b>Shoreline length:</b> Unknown
<b>Contour map available:</b> Yes	<b>Date mapped:</b> 2002 (SDSU)
<b>OHWM elevation:</b> None set	<b>Date set:</b> NA
<b>Outlet elevation:</b> Note set	<b>Date set:</b> NA
<b>Lake elevation observed during the survey:</b> One foot low	

### **Ownership of Lake and Adjacent Lakeshore Property**

East 81 Lake is not listed as a meandered lake in the State of South Dakota Listing of Meandered Lakes, but the South Dakota Department of Game, Fish, and Parks (GFP) manages the fishery. Most of the shoreline lies within a Waterfowl Production Area (WPA) managed by the United States Fish and Wildlife Service (USFWS). The remainder of the shoreline is privately owned.

### **Fishing Access**

There is no boat ramp or facilities on East 81 Lake. Small boats can be launched off a sandy shoreline on the northwest corner of the lake but parking is limited. There is some shore fishing access within the WPA on the north shore and from the road right of way.

## Field Observations of Water Quality and Aquatic Vegetation

The water in East 81 Lake was very clear during the survey with a Secchi depth measurement of 183 cm (72 in) and very little algae was observed. There were dense beds of sago pondweed (*Potamogeton pectinatus*), northern water milfoil (*Myriophyllum exalbescens*) and clasping leaf pondweed (*Potamogeton richardsonii*) around the entire lake.

## BIOLOGICAL DATA

### Methods:

East 81 Lake was sampled on August 18-20, 2008 with three overnight gill net sets and nine overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh ( $\frac{3}{4}$  in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ( $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , and 2 in) monofilament netting.

### Results and Discussion:

#### Gill-Net Catch

Walleye comprised 34.7% of the gill net sample followed by yellow perch (27.9%), white bass (21.1%) and black bullhead (12.6%) (Table 1). Other species sampled included yellow bullhead, white sucker, and northern pike.

**Table 1.** Total catch from three overnight gill net sets at East 81 Lake, Brookings County, August 18-20, 2008.

Species	Number	Percent	CPUE <sup>1</sup>	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	66	34.7	22.0	$\pm 5.1$	11.2	65	0	96
Yellow Perch	53	27.9	17.7	$\pm 12.2$	95.8	42	2	111
White Bass	40	21.1	13.3	$\pm 4.5$	2.2	100	64	105
Black Bullhead	24	12.6	8.0	$\pm 4.9$	60.8	4	0	106
Yellow Bullhead	5	2.6	1.7	$\pm 1.5$	1.9	--	--	--
White Sucker	1	0.5	0.3	$\pm 0.4$	0.1	--	--	--
Northern Pike	1	0.5	0.3	$\pm 0.4$	1.1	--	--	--

\* Four years (2000, 2002, 2004, 2006).

#### Trap-Net Catch

Black bullhead was the most common species sampled in trap nets (88.9%) followed by yellow bullhead, white bass, walleye, yellow perch, and black crappie (Table 2).

<sup>1</sup> See Appendix A for definitions of CPUE, PSD, and mean Wr.

**Table 2.** Total catch from nine overnight trap net sets at East 81 Lake, Brookings County, August 18-20, 2008.

Species	No.	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
<b>Black Bullhead</b>	731	88.9	81.2	$\pm 65.6$	744.1	5	1	96
<b>Yellow Bullhead</b>	61	7.4	6.8	$\pm 4.2$	46.7	100	87	102
<b>White Bass</b>	13	1.6	1.4	$\pm 1.6$	0.1	--	--	--
<b>Walleye</b>	12	1.5	1.3	$\pm 0.4$	0.8	92	17	98
<b>Yellow Perch</b>	4	0.5	0.4	$\pm 0.6$	7.1	--	--	--
<b>Black Crappie</b>	1	0.1	0.1	$\pm 0.2$	0.0	--	--	--

\* Four years (2000, 2002, 2004, 2006).

## **Walleye**

**Management objective:** To maintain a walleye population with a gill-net CPUE of at least 15, 25 cm (10 in) or longer fish in three out of five lake surveys.

Although walleye gill-net CPUE decreased this year the overall quality of the population improved (Table 3, Figure 1). Walleyes more than one year old were 300-500 mm (12-20 in) long and the significantly large year class of naturally-produced age-0 fish were 130 mm (5 in) long.

**Table 3.** Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for East 81 Lake, Brookings County, 1999-2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE		3.0		2.3		4.0		35.3		22.0	11.2
PSD		--		--		--		5		65	5
RSD-P		--		--		--		0		0	0
Mean Wr		--		--		--		87		96	87

\* Four years (2000, 2002, 2004, 2006).

## **Yellow Perch**

**Management objective:** To maintain a yellow perch population with a gill-net CPUE of at least 25, 13 cm (5 in) or longer fish in three out of five lake surveys.

Yellow perch gill net catches in 2006 and 2008 have been significantly lower than those seen in 2000, 2002 and 2004 (Table 4). The population currently contains only one year class of fish which indicates inconsistent natural reproduction in recent years (Figure 2). No perch have ever been stocked in East 81 Lake (Table 7).

**Table 4.** Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for East 81 Lake, Brookings County, 1999-2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE		67.5		244.0		57.5		14.3		17.7	95.8
PSD		54		46		46		84		42	58
RSD-P		23		19		20		30		2	23
Mean Wr		93		105		100		116		111	104

\* Four years (2000, 2002, 2004, 2006).

## **Black Bullhead**

**Management objective:** Maintain a black bullhead population with a trap-net net CPUE of no more than 100.

Black bullhead trap-net CPUE increased slightly this year (Table 5) and the population consists of smaller fish with an average length of 17.1 cm (6.8 in) (Figure 3). These are most likely young fish and not slow-growing older fish. Black bullhead CPUE was much higher in 2000 and 2002 when walleye CPUE was very low suggesting some predatory influence on the population.

The few yellow bullheads sampled (CPUE = 6.8) were much larger with a mean length of 309 mm (12.2 in).

**Table 5.** Black bullhead trap net CPUE, PSD, RSD-P, and mean Wr for East 81 Lake, Brookings County, 2000-2008.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE	640.0		2,270.8		7.9		57.8		81.2	744.1
PSD	25		12		70		26		5	33
RSD-P	--		0		19		2		1	7
Mean Wr	--		97		87		80		96	88

\* Four years (2000, 2002, 2004, 2006).

## **All Species**

The 2008 northern pike CPUE was the lowest recorded in ten years, while white bass CPUE was the highest (Table 6). CPUE for other species was within previous ranges.

**Table 6.** Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in East 81 Lake, Brookings County, 1999-2008.

<b>Species</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>WHS (GN)</b>	--			0.7		--		0.3		0.3
<b>WHS (TN)</b>	--			--		--		0.3		--
<b>BLB (GN)</b>	168.5			73.7		1.0		--		8.0
<b>BLB (TN)</b>	640.0			2,270.8		7.9		57.8		81.2
<b>YEB (GN)</b>	--			--		6.5		1.0		1.7
<b>YEB (TN)</b>	--			--		179.7		6.9		6.8
<b>NOP (GN)</b>	1.0			2.7		0.5		0.3		0.3
<b>NOP (TN)</b>	1.0			0.7		1.6		0.1		--
<b>WHB (GN)</b>	--			0.7		5.0		3.0		13.3
<b>WHB (TN)</b>	--			0.3		0.1		--		1.4
<b>YEP (GN)</b>	67.5			244.0		57.5		14.3		17.7
<b>YEP (TN)</b>	24.2			4.2		0.1		--		0.4
<b>WAE (GN)</b>	3.0			2.3		4.0		35.3		22.0
<b>WAE (TN)</b>	--			0.2		0.7		2.3		1.3

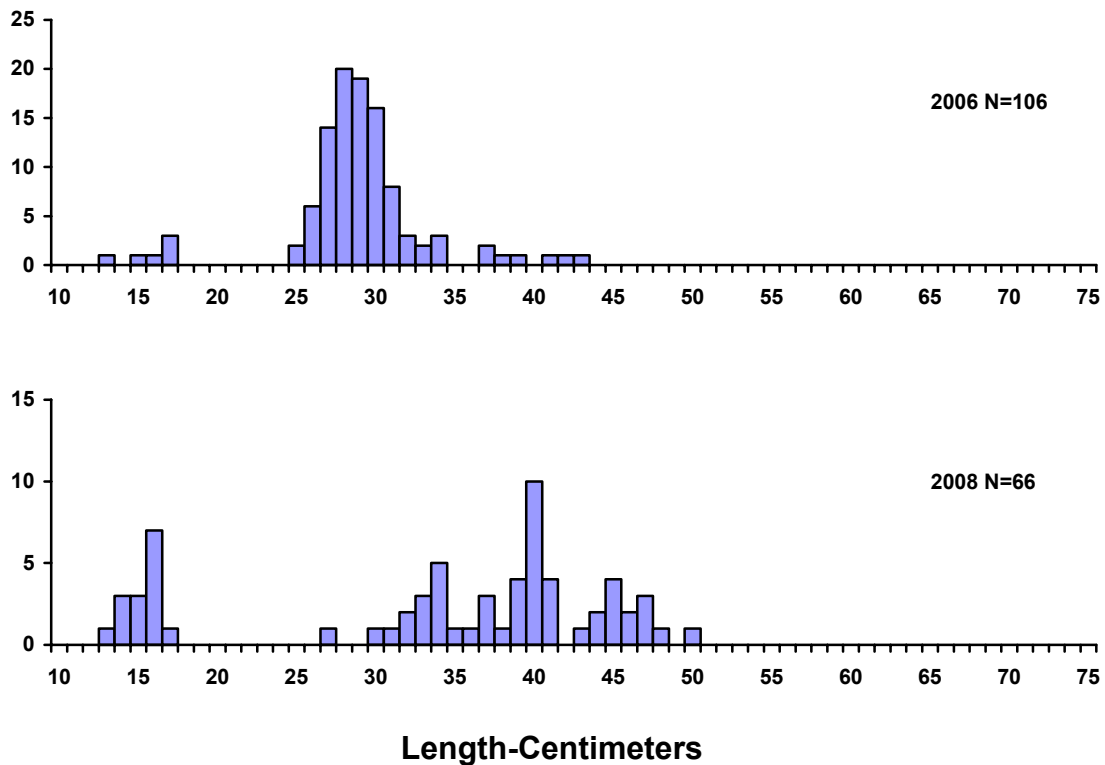
WHS (White Sucker), BLB (Black Bullhead), YEB (Yellow Bullhead), NOP (Northern Pike), WHB (White Bass), YEP (Yellow Perch), WAE (Walleye)

## **MANAGEMENT RECOMMENDATIONS**

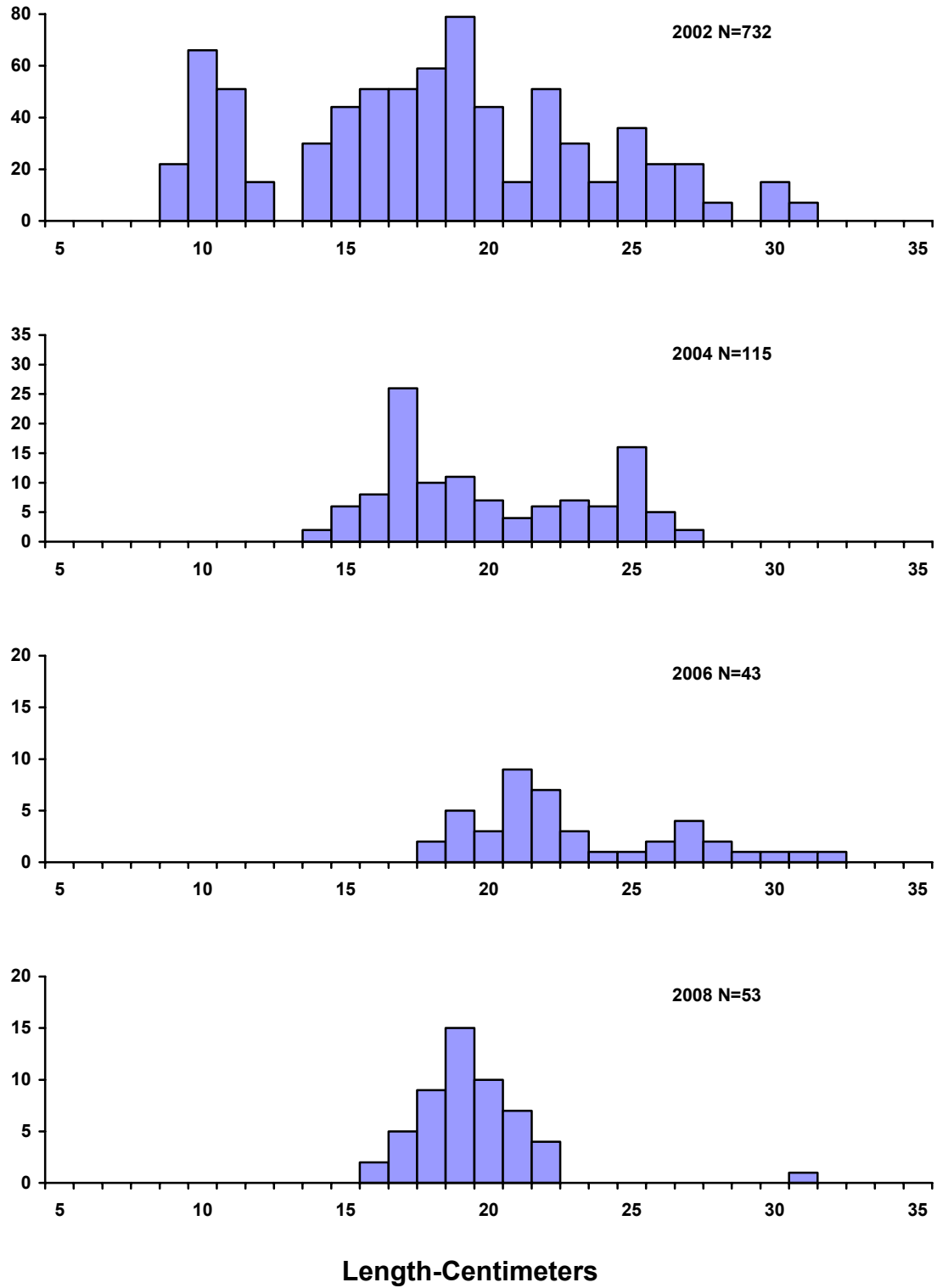
1. Stock walleye fry or fingerlings as needed to accomplish the management objective.
2. Stock yellow perch fry, fingerlings or adults as needed to accomplish the management objective.
3. Accomplish the black bullhead management objective by maintaining walleye abundance and by commercial fishing when fish in the population are large enough and abundant enough to be marketed.
4. Monitor the East 81 fishery by continuing to conduct lake surveys every other year.
5. Explore opportunities to develop boat and shore fishing access.
6. Complete a contour map of the lake. Determine which waters are connected and include connected waters in management activities.

**Table 7.** Stocking record for East 81 Lake, Brookings County, 2003-2008.

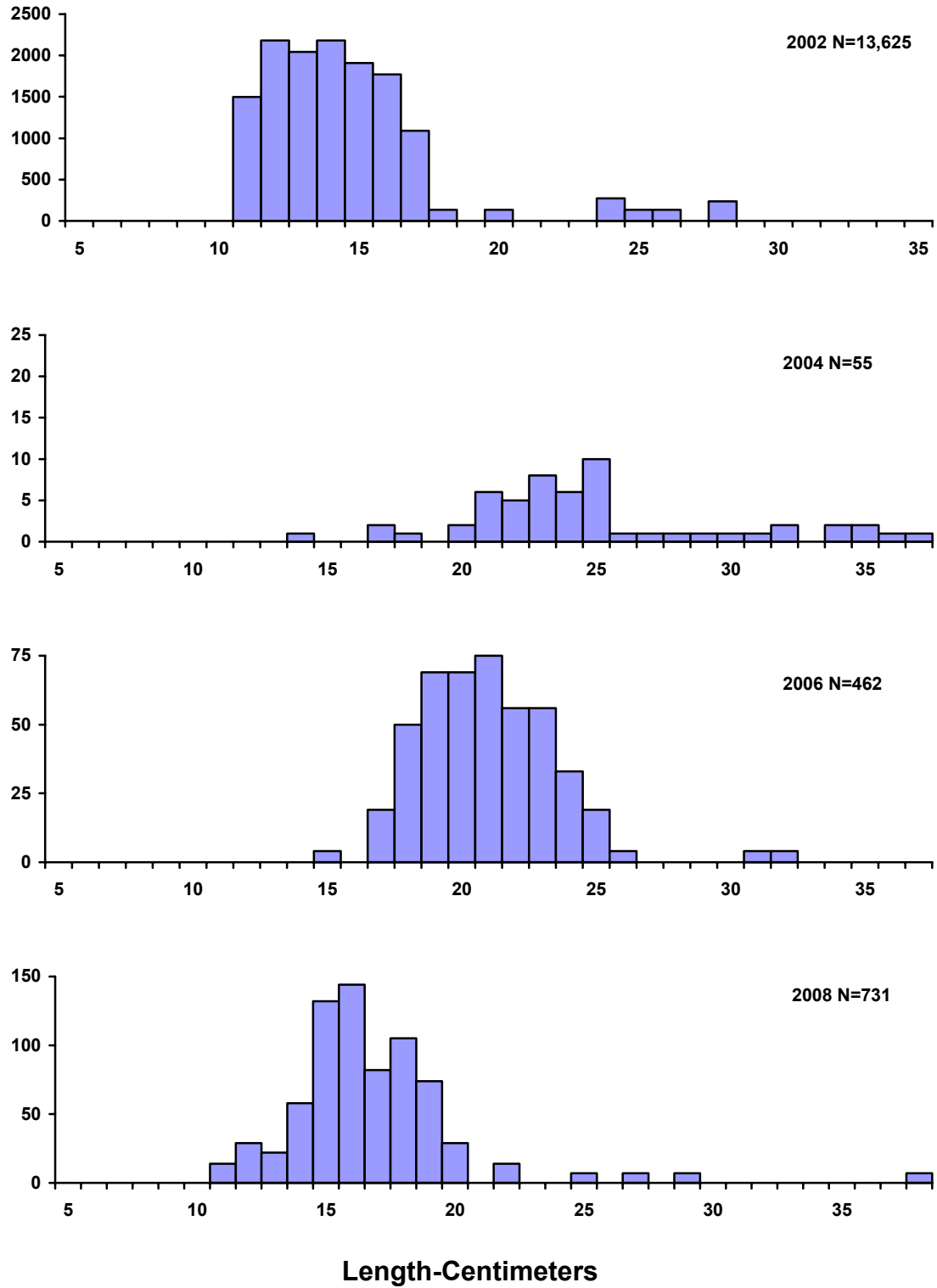
Year	Number	Species	Size
2003	440,000	Walleye	Fry
	44,820	Walleye	Fingerlings
2005	50,000	Walleye	Fingerlings
2006	49,170	Walleye	Fingerlings



**Figure1.** Length frequency histograms for walleye from East 81 Lake, Brookings County, 2006, 2008.

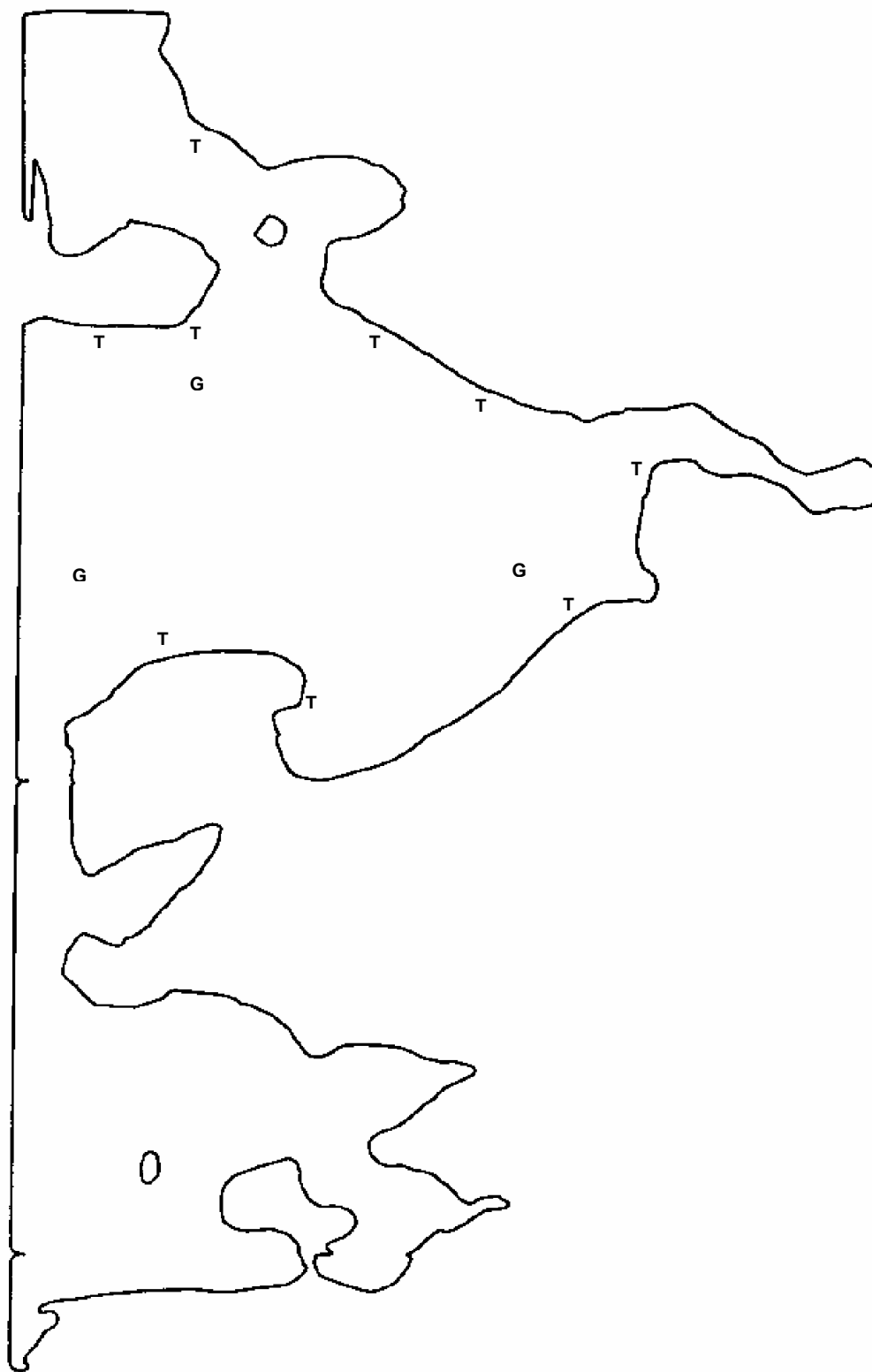


**Figure 2.** Length frequency histograms for yellow perch sampled with gill nets in East 81 Lake, Brookings County, 2002, 2004, 2006, and 2008.



**Figure 3.** Length frequency histograms for black bullhead sampled with trap nets in East 81 Lake, Brookings County, 2000, 2002, 2004, and 2006.





**Figure 4.** Sampling locations on East 81 Lake, 2008.

**Appendix A.** A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

**Catch Per Unit Effort (CPUE)** is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

**Proportional Stock Density (PSD)** is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

**Relative Stock Density (RSD-P)** is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

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For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

**Relative weight (Wr)** is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.